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## TABLE OF CONTENTS

### MEDICAL DIGESTS

Frostbite - Rapid Rewarming and Ultrasonic Therapy .....	3
Pseudomonas Bacteremia - Review of 91 Cases .....	8
Ischemic Gangrene Without Major Vascular Occlusion ....	10
Mucotaneous Changes and Blood Dyscrasias .....	10
External Cardiac Massage .....	13
Underground Shelter Tests at NNMC .....	17

### MISCELLANY

Inhalation Therapy Department - U. S. N. H., San Diego .....	18
Task Force 135 - Praised for Aid in Hurricane Carla .....	19
Consent of Patient for Observers and Photographs .....	20

### PREVENTIVE MEDICINE

Resistance of Insects to Insecticides .....	22
Water Bacteria in Hospitals ....	24

### PREVENTIVE MEDICINE (continued)

Control of Australorbis Glabratus by Marisa Cornuarietis .....	26
Control of Filariasis in Tahiti .....	26
Chemotherapy of Malaria .....	27
Fish Poisoning - Naval Air Station, Barbers Point, Hawaii .....	29

### DENTAL SECTION

Transition from Natural to Artificial Teeth .....	30
Corticosteroids and Antihistamines in Oral Surgery .....	33
Personnel and Professional Notes	36

### RESERVE SECTION

Pay Status of Officers with Twenty Years Service .....	37
Importance of Current Directives in Answering Questions .....	38
Career Considerations in References and Directives .....	39
Association of Military Surgeons Annual Meeting .....	40



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## FROSTBITE: EXPERIENCE WITH RAPID REWARMING AND ULTRASONIC THERAPY

William J. Mills Jr and Robert Whaley, Anchorage, Alaska. ALASKA MEDICINE, Part I, Vol 2, No 1, March 1960.

(NOTE: Permission has been granted by the authors, and by the Alaska State Medical Association, publishers of ALASKA MEDICINE, to present this article in unabridged form in the U.S. Navy Medical News Letter. It will appear in three parts in successive issues of the Medical News Letter. Part I is from Vol 2, No 1, March 1960; Part II, from Vol 2, No 4, December 1960; and Part III from Vol 3, No 2, June 1961.

These contributions by Doctor Mills and his associates are considered timely, highly significant, and important to all Medical Department personnel. Stepped-up military preparedness operations in frigid zones of the World dictate that members of the Medical Department of all Corps, ratings, and ranks acquire a sound working knowledge of the prevention and treatment of all types of cold weather injuries. Fortunately, much research activity on these problems has been actively sponsored by the Bureau of Medicine and Surgery and the Office of Naval Research. This work was done in laboratories and in the actual environments of extremely bitter cold in the Polar and sub-Polar areas. A great deal has been learned, but there still remains a continuing and urgent need to seek new knowledge. The objective is to give man the best possible opportunity of survival and maintenance of military effectiveness in these extremely dangerous regions of the World.

Parts II and III of these studies were aided by Contract Nonr-3183 (00) (NR 105-249) between the Office of Naval Research, Department of the Navy, and William J. Mills Jr., M.D.)—Editor

### I. INTRODUCTION

Cold injury, a major medical problem of the military surgeon in time of war is at any time a matter of concern to the physician in the Arctic and sub-Arctic areas. Cold trauma is of worldwide occurrence and encompasses the patterns of chilblains, immersion foot, trench foot, and frostbite (1). It may occur even in tropical latitudes in mountainous terrain where an arctic environment may be found, and in tropical waters after long immersion. In the event of a rare catastrophe, high altitude flight provides a setting for severe cold injuries where the complications of anoxia (itself thought to be a predisposing factor by some authors) are often present.

Reports of injury from cold may be found in most Alaska hospital records. The general experience indicates that frostbite or true freezing of tissue is the commonest form of cold injury treated in Alaska (2). Here one naturally expects and finds this injury most common in winter, but hunters



and mountain climbers have fallen victims even in July and August. An examination of hospital records and discussions with physicians, both civilian and military throughout the state, have demonstrated much disagreement in methods of management of the injury.

Here and elsewhere, frostbite has been treated by such highly variable methods as packing the part in ice, primary application of pressure dressings, sympathetic block, insulation of the affected part at room temperature, and by the application of local heat in many forms, including the use of diathermy (1. 3-9). Adjunctive measures have included sympathectomy, sympathetic block, anti-coagulants, antibiotics, vasodilators, corticosteroids, and combinations of these. Early or late debridement and/or amputation has frequently been a part of these variable programs (4. 10-11).

Some variation in treatment may be expected in a group of physicians and the individual cases may demand some adjustment of methods. It would seem, however, that the latitude of treatment permitted between packing the part in ice on the one hand and immersing it in a warm water bath on the other, or between considered watchful neglect on one hand and early amputation above the site of demarcation on the other, could profitably be narrowed.

The purpose of this paper is to report the authors' initial experiences with frostbite and to review such current opinion in the field as may be of interest to Alaskan physicians. The interest of the authors in this problem was aroused early in 1955 by a group of patients who had sustained clinical frostbite, and all of whom had undergone amputation of one or both of the lower extremities at levels varying up to the low thigh. They were stimulated to try to find some treatment that would minimize or eliminate such severe losses.

This concept has been re-enforced after treatment of a number of cases of frostbite at the Alaska Native Hospital and in Providence Hospital in Anchorage. A series of cases will be presented in which the treatment consisted of early or delayed rewarming of the involved part, scrupulous protection of the injured extremity from trauma and infection, the avoidance of unnecessary debridement or amputation, and the early institution of physiotherapy, both active and passive, and in most cases the use of ultra high frequency sound in a water bath during the critical first three weeks. Serial serum glutamic-oxaloacetic transaminase and other enzyme determinations were used as additional objective measures of deep injury.

## II. BACKGROUND

Frostbite may be defined as the cooling of body tissue to the point of ice crystal formation (12). There have been numerous classifications of frostbite as to severity, the duration of exposure, the type of cold (wet or dry), the rapidity of freezing and other factors. Further, it has been customary to classify the injury in "degrees," similar to the older burn terminology (1. 4. 9. 13-14). A variety of signs are usually listed to determine the "degree" of frostbite and, therefore, to guide treatment. Although some differences in management will exist between more trivial and serious cases, it is apparent that, as in burns,



even the experienced clinician will have great difficulty in accurately classifying the severity of injury early and that a more simple classification as to superficial or deep would probably be more suitable. Moreover, the involved extremity may exhibit several degrees of injury without regard to a regular pattern or progression. As will be discussed later, a further classification of great usefulness clinically is whether or not there is significant lowering of general body temperature.

Analogies have been drawn between frostbite and thermal burns (15). Although both of these injuries result in blister formation, similar early microscopic changes in muscle tissue, and certain similarities in gross appearance, it is the firm opinion of the authors that this analogy is not an accurate one and is particularly undesirable because of misleading inferences often drawn therefrom.

The mechanism of injury in frostbite, although still not clearly understood, apparently depends on at least three distinct processes. The first and most obvious is the actual disruption of cellular and tissue structure due to ice crystal formation. Experimental work on laboratory animals by many investigators has demonstrated that the tissue injury is greater in conditions where cooling is slower, where the period of cold is prolonged, and particularly where the rate of rewarming is slow even for cases with roughly equivalent depth of frost penetration (15-18). Meryman, working at The United States Naval Medical Research Institute, has done extensive pathological studies of such tissues and has demonstrated that the size of ice crystals formed in tissues is inversely proportional to the rate of freezing, and that the prolonged maintenance of a tissue in a partially frozen state where ice crystals are in equilibrium with the tissue fluid results in slow accretion to these crystals with a growth in their size and further tissue damage (19). These observations are consistent with predictions from the authors' knowledge of the characteristics of two-phase equilibrium mixtures in other situations and are also consistent with the experience of the meat packing industry that rapid freezing and adequately low temperature maintenance is necessary to proper preservation of foodstuffs (12-20). There appears to be good evidence from this and other work that the maintenance of a tissue at its freezing point, usually  $-2$  to  $-5$  degrees Centigrade, may be more detrimental than the maintenance of this tissue at a much colder temperature (12-17).

Associated with the ice crystal formation is some type of direct cold injury to protoplasm which is probably in part at least due to extensive dehydration. This apparently is only partially reversible.

A third type of tissue injury is that due to impaired circulation. This is evidently a prominent cause of injury in "trench foot" and "immersion foot," and is thought by some investigators to have a prominent role in further damage in the recovery phase of frostbite (21). (This opinion has led to the widespread use of anticoagulants and vasodilators in the immediate post-freezing period.) It is most evident when tissues are in the temperature range of  $+5$  degrees to  $+15$  degrees Centigrade (15-17). In view of these experimental and theoretical considerations it appears that the time the involved tissue is frozen



should be minimized and that once thawing begins there should be rapid rewarming to normal body temperature.

Once initial rewarming is accomplished, the physician is faced with the equally important clinical problem of preventing secondary changes, such as fibrosis of intrinsic muscles, sludging of blood, thrombosis of vessels, and irreparable changes in peripheral nerves. With this in mind the authors decided to use a potent tool heretofore not employed in this problem, ultra-high frequency sound. The major advantage of ultra sound over conventional diathermy is deep penetration of tissues.

Standard commercial ultrasonic equipment, then available in 1955-56, appeared to suit this purpose. Its utilization, effective in whirlpool or water bath, permitted penetration to all deep structures found in the extremities, including bone. The authors have felt that the condition of structures deep to skin is the determining factor in the eventual outcome of the frozen extremity. Assuming this to be so, it seemed logical for initial therapy that treatment be directed to the injured, but still viable, deep structures, especially vessels and nerves, as well as bone and intrinsic musculature including tendon. Treatment then was directed, not to the changes so glaringly apparent in the envelope of skin, but to the more important contents. The preservation of these, the deep structures, provides the maximum results since skin may readily be replaced by the indicated graft procedure at the proper later time.

Unfortunately, the rapidity of cooling of the injured part and the total duration of cold exposure are not usually within the control of the clinician in naturally occurring frostbite. In addition, most cases have already undergone thawing when seen first. (The early treatment of frostbite cases will be discussed in Part II of this paper.) However, in accordance with the above principles, the following program of treatment was planned and applied whenever possible to the cases which are the subject of this paper.

### III. METHODS

When first seen, the patient was evaluated for any deficiency of general body heat and efforts were directed at first instance to restoring this by the general application of heat externally and internally by ingestion of warm liquids. Parts still frozen or cold were then brought to body temperature by immersing in a warm water bath at temperatures from 42 to 48 degrees Centigrade (110 to 118 degrees F.). A whirlpool bath was usually used which provided more rapid heat transfer than a simple water bath. This was followed with very careful cleansing of the part with thorough but gentle scrubbing with a germicidal solution, benign to the tissues. In most cases, this consisted of a hexachlorophene-containing detergent (pHisoHex<sup>R</sup>). Scrupulous care was taken to avoid trauma to the tissues and to avoid puncture of any blebs present. Following the achievement of as nearly an aseptic state as possible, the involved part was placed at rest on a sterile sheet and covered with a cradle over which a second sterile sheet was arranged to prevent contamination and unnecessary contact. No dressings of any kind were used except for small pledgets of



sterile cotton which were inserted between the distal phalanges to avoid maceration.

Physiotherapy was instituted immediately when possible with whirlpool baths, usually combined with ultrasound therapy. Baths were given for twenty minutes once or twice daily for one to two weeks under as nearly sterile conditions as could be achieved. Active motion of the affected part was immediately encouraged. Passive manipulation was delayed until the acute stage had subsided and until danger of infection had diminished. Antibiotics were utilized in the same amounts and for the same rationale as are used with open fractures. Ultrasonic treatment was used in dosages of one to one and one-half watts per square centimeter in a water medium, the sound head as close as possible without contacting the extremity. The application of this high frequency sound was prescribed for five minutes once or twice daily within the bath. In general, the method was directed towards the restoration of normal circulation, to the prevention of infection and ascending gangrenous change, and to the preservation and early rehabilitation of muscle and joint function.

(to be continued)

#### BIBLIOGRAPHY

1. Whayne, T. F.; DeBakey, M. E.: Cold Injury, Ground Type. Med. Dept. U. S. Army, U. S. Govt. Printing Office 1958.
2. Storrs, H. G.: Frostbite. N. W. Medicine. 56-816, July, 1957.
3. Lane, F. H.; Ballerud, J.: Evaluation of Methods for the Treatment of Frostbite. USAF Prop. No. 21-01-012 January 1951.
4. Aryev, T.: Benefits of Rapid Rewarming. Trans. from Klinicheskaya Medicina. 28(3): 15-24, 1950. (USSR)
5. Higgins, A. R. et al. Effects of Cortisone on Frostbite Injury. U. S. Armed Forces Med. J. 3,369. March 1952.
6. Green, R. Frostbite and Trench Foot. Lancet 1: 303. Feb. 17, 1940.
8. Lewis, R. B.; Moen, P. W.: Further Investigations Frostbite. USAF Proj. No. 21-23-006. School of Aviation Med. Aug. 1951.
8. Lefis, R. B.; Moen, P. W.: Further investigations on the use of Heparin in the Treatment of Experimental Frostbite. USAF Proj. No. 21-1202-0001. May, 1953. School of Aviation Med.
9. Girgokay, S. S.; Aryev, V. Ia. Clinical Handling and Treatment of Frostbite. Trans. from Vrachebnoe Delo. 22(6); 415-423, 1940. (USSR)
10. Cold Injury—Korea. 1951-52. Report No. 113, Army Med Research Lab. Fort Knox, Ky. April, 1953.
11. Irwin, J. B.; Schultz, H: Treatment of Frostbite of Toes. U. S. Armed Forces Med. J. 2; 1161. Aug. 1951.
12. Ferrer, M. J. (Ed.); Cold Injury, Transactions of the First Conference. Josiah Macy Jr. Foundation. N. Y., 1951.
13. USN. Low Temperature Sanitation and Cold Weather Med. NavPers. 10997-A.
14. Stolierenko, D.; Contributions to the Question of the Clinical Aspects of Frostbite. Trans. from Ortopediia i Travmatologiya, 14(5-6)101-107, 1940. (USSR)
15. Ferrer, M. J. (Ed) Cold Injury, Transactions of the Second Conference. Josiah Macy Jr. Foundation. N. Y. Nov. 1952.
16. Lewis, R. B.: Effect of Rapid and Prolonged Rewarming on the Extent of Local Cold Injury. USAF. Proj. No. 21-23-006. School of Aviation Med. April 1951.
17. Dawson, D.; Hardenbergh, E.: Effect of Rapid Rewarming on Tissue Survival of Frozen Rabbits Feet. J. Appl. Physiol. 12; 155. March, 1958.
18. Shumacher, H. B.; Kunkler, A. W.: Rapid Thawing and Prolonged Local Cooling in the Treatment of Frostbite Resulting from Exposure of Low Ambient Temperature. Surg., Gynec. and Obst. 94; 475-480. 1952.
19. Meryman, H. T.: Mechanical Freezing in Living Cells and Tissues. Science 224;515. Sept. 21, 1956.
20. Tressler, D. K.; Evers, C. F.: The freezing Preservation of foods. Avi Pub. Co. N. Y. 1957.
21. Khaskelevich, M. G.; Vasil'kovan, V. Ia.: Some new measures in the treatment of Frostbite. Trans. from Vrachebnoe Delo, 23(2): 95-100, 1941. (USSR)



Pseudomonas Bacteremia: Review of Ninety-One Cases \*

J. A. Curtin, \*\*, Washington, D. C., R. G. Petersdorf, Seattle, Wash., and I. L. Bennett Jr, F. A. C. P., Baltimore, Md. Ann Int Med 54: 1077-1107, June 1961.

For several reasons, the role of bacteria of the *Pseudomonas* group in human disease has received increasing attention in recent years. Antimicrobial drugs have reduced morbidity and mortality from many infections and have virtually eliminated several common pathogenic microorganisms as major threats to life. It is not surprising that therapeutic efforts now tend to focus upon those microbial species that remain poorly controlled by chemotherapy. With the possible exception of the hemolytic staphylococcus, the coliform and related gram-negative bacteria have been the most troublesome because of their irregular susceptibility to the drugs now available. Among these bacilli, *Pseudomonas aeruginosa* is so notoriously resistant that it occupies an almost unique position. There is considerable evidence that serious gram-negative bacillary infections are occurring with greater frequency; the incidence of pseudomonas bacteremia is rising. This is in no small part attributable to ecologic changes wrought by antimicrobial drugs. It is now well recognized that the normal microflora of the human body maintains an important balance that in some way deters invasion by pathogens. This balance can be altered by antibiotic therapy, particularly by so-called broad spectrum coverage which eliminates susceptible commensals and leads to unbridled multiplication of resistant "saprophytic" species. In this situation, "superinfection" by drug-resistant bacteria becomes likely. Prominent among the survivors are the *Pseudomonas* bacilli. Finally, as has been pointed out in connection with nosocomial staphylococcal infections, improved management has led to prolonged survival in many chronic diseases, and there has accumulated a large population of elderly, debilitated, and chronically ill patients whose resistance to bacterial infection is impaired. The susceptibility of these individuals can often be attributed to their primary disorder, but the use of radical surgery, ionizing radiation, and drugs which alter the leukocyte, inflammatory, or immune response are also factors of growing importance.

The many case reports and reviews that have been published on pseudomonas infection in man since its recognition as a pathogen by Charrin in 1890 indicate clearly that disease produced by these organisms is not a rarity. However, in view of the several factors already mentioned that have given added significance to pseudomonas infections in clinical medicine, a reexamination of their nature seems justified. It is the purpose of this report to review the problem of *Ps. aeruginosa* infection in man on the basis of an analysis of 91 cases of pseudomonas bacteremia observed at The Johns Hopkins Hospital. Bacteremia was chosen as the criterion for inclusion of cases for study because of the difficulty in evaluating the finding of these bacilli in cultures of localized inflammations of the skin, wounds, ear, eye, and elsewhere. The authors do not mean to imply that a positive blood culture is synonymous with



generalized infection; indeed, among the patients included, there were several examples of transient or terminal bacteremia. However, one of the aims of this review has been to define the significance of culturing *Pseudomonas* from the blood in terms of the pathogenesis of infection, host factors in resistance, and relationship to antimicrobial drugs.

The records of 88 patients who had had 91 bouts of pseudomonas bacteremia were studied. Eighteen of these occurred in premature infants, 27 among children with congenital abnormalities or severe acquired diseases such as nephrosis, 28 in children and adults with blood dyscrasias, and 18 in adults with a variety of illnesses, frequently following urologic instrumentation. Forty-six patients were less than 12 years old and males predominated, particularly in the group of premature infants and in the elderly adults.

The prognosis was poor and there were only 15 survivors. Bacteremia was successfully treated in 12 additional cases, but death occurred due to associated disease. In general, the associated disease state was the most important single factor affecting the outcome.

The clinical picture was not characteristic, and in adults resembled any bacteremia. Among infants, fever was unusual. Ecthyma gangrenosum is diagnostic of pseudomonas septicemia, but was found only in one patient in this group. Leukopenia was usually associated with leukemia or antedated the infection.

Blood stream invasion by *Pseudomonas* occurred most often in patients receiving prophylactic antibiotics, and in 22 instances it developed as a superinfection, frequently following staphylococcal bacteremia. *Pseudomonas* infections are rarely seen in patients at the time of hospitalization and are almost always nonsocomial. Certain clues should increase the suspicion of pseudomonas septicemia:

1. Infection of the umbilical stump or of the skin in premature infants.
2. Sudden deterioration in the status of children with nephrosis or mucoviscidosis.

3. Leukemic patients who, during the acute stage with leukopenia, are receiving antimicrobials, steroids, and folic acid antagonists.

4. Patients undergoing therapy for serious staphylococcal or coliform infections in whom a worsening in the clinical picture after initial improvement suggests that a superinfection with *Pseudomonas* might be present.

Response to treatment is variable and depends to a large extent upon the underlying disease. Polymyxin B was the most effective antibiotic and should be given in conjunction with streptomycin. Adequate drainage was as necessary in sepsis with *Pseudomonas* as in any other infection. Morphologic confirmation of the pathogenicity of this organism was obtained in 75% of the 55 autopsied cases.

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\* \* \* \* \*



Ischemic Gangrene Without Major Organic  
Vascular Occlusion: An Enlarging Concept

J.D. Hardy and Fikri Alican, Dept of Surgery and University Hospital,  
University of Mississippi Medical Center, Jackson, Miss. Surgery  
50:107-114, July 1961.

The phenomenon of ischemic gangrene developing in the absence of major organic vascular occlusion has received increased attention in recent years. Four cases of incipient or overt tissue necrosis unassociated with major organic vascular occlusion are presented by the authors. Pathophysiologic circumstances which may predispose to the development of gangrene include chronic heart failure with reduced cardiac output, derangements in one or more of the three major components of pulmonary function, and prolonged arteriospasm from any cause. Aortic insufficiency, a special form of heart disease, apparently may result in bowel infarction in the absence of congestive failure. Shock due to any cause may adversely affect peripheral blood flow in a variety of ways; it is the most common predisposing cause of gangrene in the absence of major arterial occlusion.

The special problem of possible synergistic effects of endotoxin and endogenous norepinephrine in producing tissue necrosis is considered. Data are presented which demonstrate sharply elevated norepinephrine levels in dogs subjected to lethal endotoxin shock. The possible importance of the endotoxin-norepinephrine factor in producing the bowel changes found in one of the authors' patients with peritonitis and shock is reviewed. Hypoxia is the ultimate cause of acute tissue necrosis in most instances. Any disease condition which interferes with the delivery of an adequate oxygen supply at the cellular level may predispose to gangrene, whether or not major arterial occlusion is an additional contributing factor.

\* \* \* \* \*

Mucotaneous Changes - Manifestations of Blood  
Dyscrasias and Hemorrhagic Disturbances

Werner W. Duemling MD\* and CAPT Clyde W. Norman MC USN. \*\* Arch  
Dermat 84:273-289, August 1961.

The skin is the largest organ of the human body and is physiologically intimately associated with the other structures (which it protects) by way of the nerves, blood vessels, and interchange of secretions from the glands within itself as well as the endocrine glands. Because of these factors, it has long been known as an excellent mirror of both normal and pathologic states. Its normal functions are those of protection, heat regulation, secretion, and excretion which it performs with a high degree of efficiency. Any gross deviation of the normal functions of the skin is quite immediately apparent with varying symptoms



referable to the skin and the appearance of various dermatologic lesions. In addition, many obscure and deep-seated pathologic processes, such as endocrinopathies, metabolic disorders, systemic intoxications, hematologic diseases, and neoplastic diseases, disorders of the nervous system, collagen disorders, infectious diseases, and disorders of the liver and biliary tract may have dermal components to which Wiener has aptly given the name "dermadromes." It is apparent, then, that the diagnostician and particularly the dermatologist must develop a high degree of familiarity with "cutaneous medicine." He can no longer be a morphologist or externist, but must be continually alert to his responsibilities for the prompt diagnosis and correct treatment of the many systemic diseases that evoke these dermadromes. It must not be presumed, however, that morphologic familiarity and interpretation can replace more accurate clinical and laboratory diagnostic procedures to arrive at the correct diagnosis.

This study correlates and classifies the great variety of mucocutaneous manifestations which run the gamut from atrophy to wheals seen with blood dyscrasias. This of itself is a large and important chapter of hematologic dermadromes.

The matter of classification of blood dyscrasias is not a simple one since, in the light of newer knowledge, the old standard classifications have been undergoing constant revision. The classification which the authors arrived at after considerable study of the available authorities and with due consideration for the "Reports of the Committee for Clarification of the Nomenclature of Cells and Diseases of the Blood and Blood-Forming Organs" is presented in Table 1. In arriving at this classification they were motivated by simplicity and the inclusion only of blood dyscrasias and hemorrhagic disturbances which, per se, present mucocutaneous changes. The classification then falls into three broad categories: Disturbances of Erythrocytes; Disturbances of Leukocytes; and Hemorrhagic Disturbances. (Table 1 showing the categories of classification appears on page 12.)

Dermadromes, or skin pictures, in some instances appear early and may be the only sign directing the attention of the alert diagnostician to a more profound and serious process demanding further observation and hematologic study. Sometimes, the dermatologic manifestations of these obscure and not yet fully established morbid states may be transient and nonspecific, while at other times, they may be specific and diagnostically helpful.

The magnitude of the problem and its possibilities are evident by the fact that a study of the mucocutaneous manifestations of the blood dyscrasias due to pathologic changes in the cellular elements of the blood alone includes twenty-three conditions which may be associated with a variety of up to thirty mucocutaneous changes. In a few instances, such as the thrombocytopenic purpuras and sickle-cell anemia, there may be only one manifestation, but this occurs regularly and becomes part of the symptomatology of the disease.

On the other hand, such conditions as the anemias and leukemias are associated with dermatologic manifestations causing the patient sufficient discomfort to prompt him to seek help from the dermatologist, although he is



entirely unaware of a more serious and deep-seated problem. Some conditions, notably the leukemia-lymphoma group and neutropenia, present a changing cutaneous picture ranging from a nondescript maculopapular eruption through various stages to frank ulceration and destruction. The hemorrhagic disturbances can be grouped under thrombocytopenic and nonthrombocytopenic purpuras, and comprise fourteen separate entities associated with bleeding, ecchymoses, and petechiae. The former group is usually a manifestation of some serious underlying hematologic or systemic dyscrasia, while the latter group can be caused by drugs, nutritional disturbances, allergies, damage to the vessel walls or the platelets, dysglobulinemia, and increased capillary fragility.

A knowledge of, and familiarity with, these dermadromes not only broadens the understanding of the dermatologist as a student of cutaneous medicine, but enhances his value to his patients and makes him a valuable and worthy ally to the internist and his other colleagues in serving the whole man.

TABLE 1.—*Classification of Blood Dyscrasias*

I. Disturbances of Erythrocytes	(a) Acute (b) Chronic
A. Anemia	4. Atypical
1. Macrocytic Anemia	(a) Chloroma
(a) Pernicious anemia	(b) Leukemic erythroderma
(b) Nutritional anemia	III. Hemorrhagic Disturbances
2. Normocytic Anemia (Hemolytic)	A. Thrombocytopenic Purpuras
(a) Sickle-cell anemia	1. Idiopathic
(b) Cooley's anemia	2. Symptomatic
(c) Congenital hemolytic jaundice	3. Thrombotic
(d) Aplastic anemia	B. Nonthrombocytopenic Purpuras
(e) Symptomatic hemolytic anemia	1. Allergic Purpuras
3. Microcytic Hypochromic Anemia (Iron-Deficiency)	(a) Henoch's purpura
(a) Chlorosis	(b) Schönlein's purpura
(b) Plummer-Vinson syndrome	(c) Purpura fulminans
B. Erythrocytosis	2. Toxic Purpuras
1. Polycythemia vera	(a) Infections
2. Polycythemia, secondary	(b) Chemicals, etc.
II. Disturbances of Leukocytes	3. Capillary Abnormalities
A. Neutropenia	(a) Hereditary hemorrhagic telangiectasia
1. Toxic	(Rendu-Osler-Weber syndrome)
2. Allergic	(b) Vascular hemophilia (von Willebrand)
3. Idiopathic	4. Miscellaneous Purpuras
(a) Cyclic	(a) Purpura senilis
(b) Familial	(b) Dysglobulinemic purpuras
B. Leukemia	(c) Dermatologic purpuras
1. Myelocytic	(i) Progressive pigmentary disease
(a) Acute	(Schamberg)
(b) Chronic	(ii) Purpura annularis telangiectodes
2. Lymphocytic	(Majocchi)
(a) Acute	(iii) Pigmented purpuric lichenoid dermatitis
(b) Chronic	(Gougerot and Blum)
3. Monocytic	

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(NOTE: It is strongly recommended that interested Medical Department personnel read the original of this highly informative article. The authors present detailed descriptions of the mucocutaneous changes observed in the many disorders listed in Table 1 (supra). There are 16 excellent illustrations in color:

- (1) Nutritional anemia - papillary atrophy of tongue
- (2) Sickle-cell anemia - leg ulcer
- (3) Polycythemia vera - rosacea (courtesy of Dr. S. Bluefarb)
- (4) Neutropenia - mucosal ulcers
- (5) Myelocytic leukemia - swollen, bleeding gums
- (6) Lymphocytic leukemia - hemorrhagic herpes zoster
- (7) Monocytic leukemia - nodule (courtesy of Dr. A.C. Curtis)
- (8) Lymphocytic leukemia - generalized exfoliative dermatitis
- (9) Thrombocytopenic purpura
- (10) Henoch-Schönlein purpura
- (11) Purpura fulminans
- (12) Toxic purpura (penicillin)
- (13) Hereditary hemorrhagic telangiectasia
- (14) Purpura senilis
- (15) Cryoglobulinemic purpura and gangrene (courtesy of Dr. Robert Volpe)
- (16) Progressive pigmentary disease (Schamberg)

—Editor)

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#### External Cardiac Massage

J. R. Baringer, E. W. Salzman, W. A. Jones, and A. L. Friedlich, from the Depts of Medicine, Surgery, and Pathology, Harvard Medical School and the Massachusetts General Hospital. New Engl J Med 265: 62-65, July 13, 1961.

Thoracotomy and open-chest cardiac massage have been used for sometime in the management of sudden circulatory arrest. Although useful, the procedure is a formidable undertaking, particularly when not done in the operating room.

Recently, Kouwenhoven, Jude, and Knickerbocker described a technic for cardiac massage without opening the chest. Their report, and the early gratifying experience with this technic at the Massachusetts General Hospital, prompted a review of the 84 cases in which it has been used there by many members of the staff during the past 6 months. Every case has been included in which external cardiac massage was used, even briefly, and irrespective of the nature or extent of the patient's underlying disease. This has resulted in a low survival rate, but the simplicity of the technic has led to its use in desperate and hopeless cases.

The technic of external cardiac massage is simple and requires no special equipment. The fixation of the heart in the mediastinum and the flexibility of the chest in the unconscious patient permit effective massage of the heart by external compression over the lower sternum. With the patient supine and preferably on a hard surface, the lower sternum is sharply compressed 60 to 90 times per minute with a force sufficient to move it 3 or 4 cm toward the vertebral column. Although this procedure provides some pulmonary ventilation, it has been the authors' practice to insert an endotracheal



tube as quickly as possible to permit intermittent bag breathing. Whenever possible, the volume of the femoral pulse and the size of the pupils should be closely observed to judge the effectiveness of the cardiac massage. This permits use of the minimum force necessary to obtain effective circulation. It is important to apply pressure only over the sternum to minimize rib fractures and to avoid soft-tissue injury.

The emergency nature of circulatory arrest and the full attention directed to patient care often limit the recording of clinical details. The data available for the authors' review are, therefore, necessarily incomplete. However, during the past 6 months, they have been impressed by the effectiveness of this method in maintaining an adequate circulation.

It is evident that the ultimate result of external cardiac massage in a given patient will depend in large measure on the reversibility of the factors that led to the circulatory arrest. However, even in patients with irreversible underlying disease, the method may be considered successful if it is capable of maintaining an adequate circulation. Of the 42 patients in whom data were recorded, only 4 were noted to have weak pulses during external cardiac massage. All of the remaining 38 had evidence of adequate circulation as judged by the presence of a strong femoral pulse or the maintenance of normal pupillary size. In a few cases in which blood pressures were measured during massage, levels up to 120 mm of mercury were recorded. Even in 6 patients with moderate to severe emphysema, good pulses were obtained in 5. External cardiac massage was performed in some subjects with maintenance of good pulses for periods as long as one hour. It has been the impression of those who have had experience with both open-chest and closed-chest cardiac massage that better pulses have been obtained with the latter method. In one case in which both methods were used sequentially, this impression was directly confirmed. The apparent superiority of closed-chest cardiac massage may well be due to enhanced venous return to the heart when the chest is unopened.

In addition to maintenance of the circulation, this method may permit the return of an effective spontaneous heartbeat or permit restoration of cardiac action by electric means. An effective spontaneous heartbeat and palpable pulse were restored in 36 of the 84 patients for more than a few minutes and, in most cases tabulated in this category, for several hours. Ten of 18 patients with ventricular fibrillation were successfully defibrillated and a spontaneous heartbeat restored. This was accomplished by externally placed electrodes in 6 patients and by electrodes placed directly on the heart in 4. Recovery of consciousness occurred in 15 of 81 patients. Twenty-three patients survived for over 3 hours; 19 of these died of a variety of causes related to their underlying disease 3 hours to 13 days later. Four patients left the hospital in good health.

External cardiac massage was used in a wide variety of circumstances. In 63 cases, the patient and the nature of his disease were known to the physician at the time the procedure was employed. Five patients had circulatory arrest in the operating room; of these, 4 were resuscitated. Three of these

subsequently died, one of gastrointestinal hemorrhage, a second of peritonitis, and the third of renal failure. The remaining patient had circulatory arrest during anesthesia for a laminectomy. External cardiac massage was given for 40 seconds, and the electrocardiogram showed a return to normal sinus rhythm. He recovered uneventfully. The patient who could not be revived had circulatory arrest after thalamotomy for the relief of pain due to widespread metastatic cancer.

Twenty-four patients had circulatory arrest complicating myocardial infarction. Of these, few collapsed under the direct observation of the physician, and hence the duration of circulatory arrest before external massage was usually unknown. One patient was revived for 6 hours; atrioventricular block developed and he subsequently succumbed to cardiac standstill despite the use of a cardiac pacemaker. Of the 9 patients with congestive heart failure, one survived for 15 hours. He was discovered to be apneic, with dilated pupils and no heartbeat. External cardiac massage was performed for 30 minutes, and the pupils returned to normal size. An electrocardiogram showed ventricular fibrillation which was abolished by external defibrillation with eventual resumption of normal cardiac rhythm. It was necessary to support the blood-pressure with norepinephrine. He did not regain consciousness; decerebrate posturing later developed and he ultimately died. This was one of 4 patients in this series who survived temporarily with evidence of serious central-nervous-system damage due to anoxia. The longest survival with this complication was 9 days. One of the 4 patients with pneumonia had cardiac arrest in the presence of the physician; immediate external cardiac massage resulted in restoration of normal rhythm. He succumbed to pneumonia 2 days later.

The miscellaneous category includes 6 patients with massive bleeding, 3 with drug poisoning, 3 with aspiration of material into the trachea and a variety with other conditions. Two of the patients in this group survived to be discharged. In the first, a 57-year old man who entered the hospital for removal of a meningioma, angina decubitus had recently developed. While in the hospital, he collapsed in the bathroom and no heartbeat was audible. Immediate external cardiac massage was instituted. The electrocardiogram showed ventricular fibrillation. External cardiac massage was continued for 20 minutes while he was transported to the operating room. Thoracotomy and internal defibrillation were performed, and normal rhythm restored. Several rib fractures resulted from the external massage. However, the immediate postoperative course was otherwise uncomplicated. Nine days later, an increase in neurologic symptoms necessitated removal of the meningioma which was successfully accomplished. He left the hospital in good condition. This case emphasizes the value of external cardiac massage in maintaining the circulation over a considerable period during which facilities for additional therapy can be obtained.

The second patient, a 69-year old woman, was in congestive heart failure with frequent atrial and ventricular premature beats. In the hospital, several seizures occurred and, under observation of a physician, circulatory



arrest occurred and another seizure resulted. When a spontaneous heartbeat failed to appear after 60 seconds, during which several blows to the chest were ineffective, external cardiac massage was instituted. Three minutes later a spontaneous heartbeat occurred and the patient survived. In this case, the procedure maintained an adequate circulation during a critical period of circulatory arrest. It may have been responsible for the return of normal cardiac action. In the 8 patients who survived temporarily, external cardiac massage was successful in each in restoring normal rhythm. Each subsequently succumbed to underlying disease which, in 7 patients, was non-cardiac.

Circulatory arrest developed in 15 patients in this series under conditions in which the nature of the underlying disease was not known. Most of this group arrived in the emergency ward within minutes of apparent death. One such patient had no audible heart sounds and no palpable pulse, but because two gasps were observed, external massage was instituted and normal rhythm restored. He was totally unresponsive, requiring artificial respiration for the next 15 hours, after which he gradually regained consciousness. The cause of the circulatory arrest was never apparent, and the patient was discharged well 15 days later. Of the 3 patients who survived temporarily, one had ventricular fibrillation and was successfully defibrillated, but survived for only 4 hours. Another was given external cardiac massage; normal rhythm eventually developed, but he succumbed 9 days later to pneumonia.

The third was a diabetic patient in whom normal sinus rhythm was restored by external cardiac massage. The cause of the cardiac arrest was not discovered. He succumbed 13 days later to pneumonia. Another patient, admitted to the emergency ward without pulse or respirations and with dilated pupils, was given external cardiac massage. The electrocardiogram subsequently showed ventricular tachycardia which spontaneously reverted to normal sinus rhythm. He survived for 3 days during which time the presence of a brain-stem hemorrhage and chronic lymphatic leukemia was established. Both patients with pulmonary embolism had massive recent emboli demonstrated at postmortem examination. In both patients, subsequently found to have ruptured dissecting aneurysms at autopsy, the clinical history suggested that the rupture had occurred before the external cardiac massage.

Postmortem examinations were done on 46 patients in this series, and a significant number of complications of external cardiac massage were disclosed as recorded in Table 1.

Table 1. Complications Shown in 46 Autopsied Cases

Complication	Severity	No. of Cases	Percentage
Rib fractures	2 to 8 ribs	15	33
Hemothorax	100 to 800 ml	4	9
Hemopericardium	50 to 150 ml	2	4
Liver injury	Variable	5	11
Marrow emboli	Widespread in 5	6	13



Rib fractures were common and occurred in 15 patients involving 2 to 8 ribs. It is probable that this can be minimized if care is taken to exert pressure only over the sternum and to use no more pressure than is necessary to maintain an effective pulse. As personnel in the hospital have become more familiar with the technic, rib fractures have been sharply reduced in frequency, having occurred only once in the last 13 autopsied cases. Four patients were found to have hemothorax with 100 to 800 ml of blood, probably secondary to rib fractures. Hemopericardium was noted in 2 patients and was not associated with rib fractures. Pathologic evidence of rupture or other injury of the myocardium was not seen, in contrast to findings often reported after open cardiac massage. Five patients were found to have 50 to 500 ml of blood in the peritoneal cavity. In 3, this was related to subcapsular hematomas of the liver, with tears of Glisson's capsule; in 2 patients there were large lacerations of the liver. Five patients had extensive bone marrow emboli in the pulmonary arteries. In an additional patient, a bone marrow embolus was found adherent to a mural thrombus in the right atrium.

#### Summary and Conclusions

A review of 84 unselected cases of circulatory arrest at the Massachusetts General Hospital in which external cardiac massage was used is presented by the authors. The number of ultimate survivors was small (only 4 patients left the hospital). To an important degree, this is probably due to the nature and extent of their diseases. The procedure has been found to entail serious complications; however, the possible benefit outweighs the risk of these complications if the diagnosis of circulatory arrest has been established with reasonable certainty. The frequency of these complications, which must be considered if groups of nonmedical personnel are instructed in its use, has been reduced when experience has been obtained in the use of the method.

It is evident that this procedure is generally successful in maintaining an effective circulation, thus allowing time for additional equipment and personnel to be mobilized. It may even be more effective than internal cardiac massage. Frequently, external massage alone has resulted in restoring spontaneous cardiac action. Finally, the simplicity of the procedure permits its use under conditions in which thoracotomy and internal massage would not be feasible.

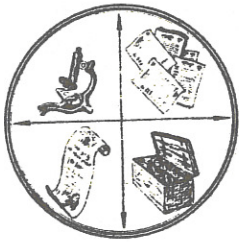
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#### Underground Shelter Tests

A construction contract has been awarded for a 100-man underground personnel protective shelter at the National Naval Medical Center, Bethesda, Md. Upon its completion, extensive shelter tests will be conducted by the Naval Medical Research Institute and the Office of Naval Research.

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## MISCELLANY

### INHALATION THERAPY DEPARTMENT U. S. Naval Hospital, San Diego, Calif.

Two previous issues of the U. S. Navy Medical News Letter (18 August and 22 September 1961) contain articles describing features of the Oxygen Therapy Service, U. S. Naval Hospital, St. Albans, N. Y. In the earlier of these issues, it was related that "this (St. Albans) is the only known U. S. Naval Hospital that operates such a service." At the time of the earlier publication, it was not construed that the Inhalation Therapy Department of the Anesthesiology Service, U. S. N. H. San Diego, was in effect an actual oxygen therapy department actively serving the entire hospital on a 24-hour, 7-day week basis. Thus, in the light of additional information received from the U. S. Naval Hospital, San Diego, the following report is made:

Subj: Inhalation Therapy Department

Ref: (a) NavHosp San Diego Inst. 5450.1B, 1/4-kh, 1 April 1961, Ch-1  
pp 16. 18  
(b) NavHosp San Diego Inst. 6700.5, 1/4-kh, 8 August 1960  
(c) NavHosp San Diego Inst. 5100.6, 1/4-kh, 8 August 1960  
(d) NavHosp San Diego Inst. 6700.3C, NH16-1-WM, 19 May 1959

1. The Inhalation Therapy Department of this hospital has been organized and functioned continuously since 1957, as a unit of the Anesthesiology Service.

2. Present organization of this Department is as contained in references (a), (b), (c), and (d). The function performed may be summarized as follows:

- (a) Administer all routine medicinal gas treatment when prescribed for in-patients or out-patients of this hospital.
- (b) Provide equipment and maintain technical supervision and assistance for all types of respirator care conducted in the hospital.
- (c) Maintain emergency resuscitation equipment wherever needed within the hospital, and provide technical assistance, on 24-hour

call whenever resuscitation measures are required.

- (d) Procure and maintain all equipment in the hospital concerned with medicinal gas therapy and resuscitation.
- (e) Conduct training classes in inhalation therapy and in resuscitation for corpsmen, nurses, and other personnel of the hospital.

3. The Department is staffed by five hospital corpsmen, all of whom have had on-the-job training. The work level reaches a peak of 250 treatments per day at some periods of the year, and the average is 75 per day.

4. Liaison has been established with teaching centers throughout Southern California and the Department has an excellent professional reputation in this district not only for its large size, but also for the broad scope of service provided.

5. The value of this type of therapy is becoming more and more apparent and the Medical officers and other staff members of the hospital are convinced that the time has come for more intensive training of increased numbers of personnel in this special field of therapy. They further feel that we should rapidly prepare our personnel to give their very best by further education in all facets of resuscitation and emergency care.

—Editor

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#### TF-135 Praised for Aid

The ill-fated residents along the southern Gulf Coast who suffered the brunt of hurricane Carla's destructive attack were delivered aid and comfort by the Navy's Task Force 135.

The Task Force, commanded by RADM F.J. Brush, and made up of the aircraft carriers ANTIETAM and SHANGRI-LA, the destroyers COMPTON and GAINARD, and the attack transport FRANCIS MARION, rushed to the scene of the storm which caused more than 400,000 people to flee the coast in Texas and Louisiana. The Task Force carried with it a company of Marines, a squadron of Marine Corps transport helicopters, medical supplies, and hospital corpsmen. A bluejacket landing party was formed to augment the Marines, and together they helped local police maintain order and protect property.

In a telegram addressed to ADM G.W. Anderson Jr, Chief of Naval Operations, Texas Governor Price Daniel said in part, "Navy transport FRANCIS MARION and other vessels are furnishing valuable assistance, food, and emergency manpower to Galveston County . . . I thank you . . ."  
(The Chief of Naval Information (CHINFO) Newsletter, Vol. XIII, October 1961)

(NOTE: Doctors, nurses, and hospital corpsmen conducted missions to Freeport, Port Bolivar, Angleton, and Oyster Creek. They administered typhoid



inoculations and gave treatments for medical and surgical conditions. Most of the latter involved secondary infections from superficial lacerations caused by flying debris. The ship's sanitation officer and his assistants provided aid to local authorities regarding potable water supply, sewage, disposal of dead animals, and insect control. Similarly, personnel from the U.S. aircraft carrier ANTIETAM delivered emergency water supplies to Port O'Connor and assisted in inoculation of many persons. Supplies of typhoid vaccine were also provided to local authorities. Local hospital staffs and officials were given other varied kinds of help in response to their urgent requests.

—Editor

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Medicolegal Forms: Patient Should Consent  
to Observers and Photos

Right of privacy is a legal area in which there has been an increased number of court cases in recent years.

A patient consulting a physician has a right not to be subjected to unwarranted and unwanted publicity which would cause him shame, mortification, and humiliation, points out the 1961 edition of Medicolegal Forms with Legal Analysis, published by the American Medical Association's Law Department.

Also, when a patient disrobes for an examination, operation, or other medical procedure, he does so for the professional benefit of the physician to aid in diagnosis or treatment. The patient does not expect to be subjected to examination by other persons, medical or nonmedical, who are not necessary to the carrying out of the medical procedure. Without the specific consent of the patient, admission of nonessential persons violates the patient's right of privacy.

The unauthorized taking of pictures of the patient can also give rise to a cause of action, even though the pictures may not have been published. It is immaterial that the patient's condition is made public because it is newsworthy and of interest to the public, or that persons are permitted to observe the patient, or that pictures of the patient are taken and published for the purpose of advancing medical science or educating the public. Only if the patient consents, should the MD permit these actions. Suggested wordings of forms follow:

Authority to Admit Observers

Patient .....

Place .....

Date .....

I authorize Dr. .... and the Hospital to permit the presence of such observers as they may deem fit to admit in addition to physicians and hospital personnel while I am undergoing (operative surgery), (childbirth), examination, and treatment.

Signed .....

Witness .....

Consent to Taking and Publishing Photographs

Patient .....

Place .....

Date .....

In connection with the medical services which I am receiving from my physician, Dr. ...., I consent that photographs may be taken of me or parts of my body under the following conditions:

1. The photographs may be taken only with the consent of my physician and under such conditions, and at such times, as may be approved by him.

2. The photographs shall be taken by my physician or by a photographer approved by my physician.

3. The photographs shall be used for medical records and if in the judgment of my physician, medical research, education, or science will be benefited by their use, such photographs and information relating to my case may be published and republished, either separately or in connection with each other, in professional journals or medical books, or used for any other purpose which he may deem proper in the interest of medical education, knowledge, or research; provided, however, that it is specifically understood that in any such publication or use, I shall not be identified by name.

4. The aforementioned photographs may be modified or retouched in any way that my physician in his discretion may consider desirable.

Signed .....

(patient)

Witness .....

The physician is best advised to have this consent from the patient in writing in specific detail. He must strictly observe any reservations or limitations in the consent.

NOTE: The Editor of the above item in the A.M.A. News of October 16, 1961 relates that this is another in a series of articles concerning medicolegal forms. It is also announced that suggested wordings of medicolegal forms to cover various situations are given in the 1961 edition of "Medicolegal Forms with Legal Analysis," a booklet prepared by the American Medical Association's Law Department. Physicians may obtain a copy without charge by writing on their letter head to: Bernard D. Hirsh, Director, A.M.A. Law Department, Box M, 535 N. Dearborn, Chicago 10, Ill. There is a charge of \$1.00 per booklet for hospitals and laymen.

—Editor

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## PREVENTIVE MEDICINE

### Resistance of Insects to Insecticides

Harold George Scott, PhD, Comm Dis Center, PHS DHEW, Atlanta 22, Ga. The Sanitarian 24:30-31, July-August 1961.

Resistance to an insecticide is the ability of insect populations to withstand a poison which was generally lethal to earlier populations. It is a reflection of populations undergoing selection to produce survival of the fittest since:

- a. Members of insect populations are highly variable.
- b. Individuals best suited for prevalent conditions have the greatest chance of surviving and reproducing.
- c. New generations will consist primarily of descendants of well-suited parents.
- d. An insecticide modifies conditions under which insects must survive.
- e. Individuals able to withstand the insecticide will survive to rebuild the population.
- f. Members of later populations usually will exhibit greater resistance to the insecticide than earlier populations.

Types of resistance fall into two categories; physiological and behavioristic. Recognized types of physiologic resistance include:

- a. **Differential Absorption Rate.** Contact insecticides must penetrate the exoskeleton of insects in quantity to kill. Some individuals in the insect population have slower absorption rates than others. During routine chemical applications, individuals with slow absorption rates receive sublethal doses and survive to rebuild the population.
- b. **Storage.** Some individuals in the insect population are able to store the insecticide in a physiologically nonsensitive tissue such as the fat body before it can kill. The individuals survive to rebuild the population after the majority has been killed by the insecticide.
- c. **Excretion.** Members of an insect population able to excrete the insecticide before it can kill, survive to rebuild the population after the slow-excretion majority has been killed.
- d. **Detoxication.** Certain individuals in an insect population are able to detoxify the insecticide before it can kill. This detoxication is usually brought about by enzymatic action. Detoxication products may be stored, excreted, or metabolized. Such individuals survive to rebuild the population

after the majority has been killed.

e. Alternate Accomplishment of Blocked Functions. Insecticides kill by interfering with the biochemical balance of the insect. Some individuals can regain normal activity by substituting another biochemical system for the one damaged by the chemical, and survive to rebuild the population.

Cases of resistance which are behavioristic rather than physiological are as follows:

a. Habitat. A few members of an insect population occupy a habitat different from that of the vast majority. During routine chemical applications, the normal-habitat majority is killed while the out-of-way minority survives to rebuild the population.

b. Avoidance. Some individuals in an insect population are sensitive to the insecticide, and tend to avoid it. During routine chemical applications, particularly of a residual nature, nonsensitive individuals are killed, while sensitive individuals survive to rebuild the population.

Sometimes one insecticide will make insects resistant to a distinctly different insecticide. For example, malathion may create DDT resistance in houseflies. This effect is not clearly understood, but is called cross resistance.

Tolerance which may be developed by individual insects is not passed on to future generations. It is a reflection of contact by the insect with a sublethal dose of insecticide. Since minute quantities of highly stable insecticides can remain in the environment for many years, tolerance may develop long after the chemical has fallen into general disuse. Two types of tolerance have been detected:

a. Physiologic Tolerance. The development of an ability in the insects to withstand larger doses due to exposure to sublethal doses is noted.

b. Behavioristic Tolerance. Sublethal doses of an insecticide cause the insects to develop sensitivity and to avoid contact with the chemical. This physiologic memory protects insects from later lethal doses.

Not all reports of resistance are valid. Other possibilities should always be explored. For example: Was the proper chemical used in the proper manner and at the proper concentration? Did a new population migrate into the area? Did the old population have time to rebuild itself? In every case suitable tests should be made to conclusively demonstrate resistance.

Resistance seems to develop more rapidly in response to high dosage. Therefore, the lowest effective concentration and dosage of insecticide should be used. Good alternate insecticides should be reserved for epidemics and disasters. Alternation of insecticides for resistance control seems impractical with our present knowledge. The use of mixtures of insecticides is also considered to be disadvantageous. Increased dosage or more efficient application may overcome low-level general resistance, but is unlikely to control high-level specific resistance.

Insects develop resistance to the most effective chemicals, and control can no longer be maintained. Therefore, while chemicals may be used for temporary relief or to minimize the insect problem, public health workers



must depend upon modification of the environmental factors which make insect life possible, to achieve highly-effective long-term control.

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### Water Bacteria in Hospitals

The continuous struggle to eradicate the lethal staphylococcus from hospitals must now encompass the potentially lethal water bugs. These gram-negative water bacilli are emerging from their traditional classification as nonpathogenic bacteria to threaten lives of hospitalized newborn babies, patients with surgical wounds and burns, and those who have been weakened and debilitated by illnesses.

This formidable host of water organisms numbers some 302 species among 10 gram-negative water organisms, and among them are 149 species of the *Pseudomonas*, associated with increasing numbers of fatal septicemias. The water organisms display remarkable ability to survive and propagate throughout a hospital, and thrive in a wet and stagnant environment.

Recently, the *Alcaligenes* were credited with fatal septicemia in the newborn; 33 infants with *Alcaligenes* septicemia were reported over a 4-year period in one hospital. *Flavobacteria meningosepticum*, an unusual and recently classified organism, was recovered in an outbreak of neonatal meningitis covering 14 clinical cases with 10 deaths. This organism has a high virulence and selectivity for the newborn infant. In another outbreak, *Flavobacterium meningosepticum*, Group C, was isolated from 44 newborn infants; 14 of them had serious infections, mainly septicemia and meningitis. Nine of these babies died, and survivors of meningitis developed hydrocephalus. Only 3 of 4 infants with hydrocephalus are living and all have severe cerebral damage. Intensive cultures of hospital personnel failed to detect any carriers, but bacteriologic studies showed a nursery sink was contaminated with the organism. Repair of a faulty sink trap brought prompt control of the outbreak.

*Flavobacteria* similar to an organism associated with meningitis in babies were found in a delivery room in a rubber hose attached to a faucet to prevent splashing. The organisms in the rubber tube could reach the skin, umbilici, eyes, ears, noses or mouths of babies during the first bath. In another nursery with 6 cases of *Flavobacterium meningitis*, these bacilli were found in a delivery room scrub sink and drain, and in suction trap bottles in the delivery room resuscitators.

*Achromobacter* was associated with respiratory difficulties, a characteristic rash, septicemia and death in 6 infants, most of them premature. This organism was found in the water that was used to wash the eyes of the babies. It was taken from the same bottle that was refilled weekly without routine sterilization, and used for all babies. The organism was later grown in sterile, distilled water and it multiplied readily at room temperature. No new cases of this syndrome were seen after the nursery was closed, completely cleaned and disinfected, and practices in asepsis were retaught and stressed.

A pure culture of *Aerobacter* has been isolated from a sponge used to clean incubators in a nursery where there was an epidemic of *Aerobacter* septicemia and meningitis.

Infants and newborn babies placed in a mist are particularly susceptible to the gram-negative water bacilli. Examination of the water in mist generators and humidifying pans in nursery incubators uncovered 15 types of organisms in the humidifying water. The majority of the oxygen therapy apparatus in one hospital was heavily contaminated with them. More recently, *Mimae*, known to cause meningitis, were cultured from mist generators and patients in a hospital nursery.

Paracolon bacteria were growing in such inaccessible parts of water reservoirs as air ducts of incubators (Isolettes) and later were found in blood streams and meninges of the babies who used them. An epidemic of septicemia and meningitis ceased only after every possible measure had been taken to insure complete disinfection of this equipment.

In these reports the water organisms did not come from mothers or their newborn babies. Only one in each of 4 sets of twins, and one in a set of triplets, were affected. Investigations showed that nasal transmission is seemingly improbable. Outbreaks associated with water organisms have come from environmental contamination.

Screens in the faucet aerators can become clogged and retain stagnant water that provides an ideal environment for the growth of *Pseudomonas aeruginosa*. This condition caused the contamination of water, faucets, sinks, counters, and sponges used to clean this equipment in the scrub sinks outside a nursery. Both hot and cold water samples yielded the *pseudomonas*. After the contaminated aerators were removed, cultures from the inside of the faucet lip and the water were negative for *Pseudomonas*, but some months later these bacilli were located in the scrub sinks again. After grossly dirty joints and fittings in sink pipes were cleaned thoroughly, repeated cultures were negative for *Pseudomonas* once more.

Though the *Pseudomonas* live but a short time when deprived of moisture, they, too, have been found in water used in humidifiers, and they have been cultured even in a disinfecting solution used to prepare skin for IV infusions. One epidemic of *Pseudomonas* septicemia has been traced to cold sterilization of surgical instruments. This may not be so surprising to bacteriologists who use media containing benzalkonium-like disinfectants to encourage a selective growth of *Pseudomonas*. *Pseudomonas* meningitis has followed diagnostic lumbar puncture, spinal anesthesia, and intrathecal medication.

Physicians and hospital personnel cannot afford to forget the versatility of water organisms, or that they multiply in sterile water containing only traces of contaminating phosphorus and sulfur. They respect neither antibiotics nor disinfectants. Control of this menacing legion of bacteria requires sterilization since gram-negative water bacilli respect only heat and autoclaving. Absolute cleanliness and removal of all stagnant, moist areas are imperative. (What's New - Abbott Laboratories, August-September 1961, No. 225)



Demonstrated Control of Australorbis Glabratus by Marisa  
Cornuarietis Under Field Conditions in Puerto Rico

Eradication or control of *Australorbis glabratus*, the intermediate snail host of *Schistosoma mansoni* by another snail, *Marisa cornuarietis*, has been suggested by recent investigations. The voracious feeding habits and rapid multiplication of *Marisa* depleted the food supply available to *Australorbis* resulting in a drastic reduction. It is assumed that *Australorbis* egg masses and small snails are consumed by *Marisa* with the aquatic vegetation.

A relatively small number of *Marisa cornuarietis* was introduced into a chain of 5 ponds containing well established *Australorbis glabratus* populations. During an 81-week observation period the *Marisa* effectively reduced the *Australorbis* population almost to extinction. The population has not recovered in one and one-half years. Additional studies are indicated to determine if *Marisa* will work equally well in other *Australorbis* habitats.

(Myron G. Radke, Lawrence S. Ritchie, and Frederick F. Ferguson. *Amer J Trop Med* 10:370-373, May 1961)

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Mosquito Control and Mass Chemotherapy  
Extremely Effective Against Filariasis in Tahiti

Drs. H. N. March, Jacques Laigret, John F. Kessel and Ben Bambridge of the Institut de Recherche Medicales de la Polynesie Francaise and the Department of Infectious Diseases, School of Medicine, University of California, Los Angeles, in the *American Journal of Tropical Medicine and Hygiene*, (supported by a grant of the National Institute of Allergy and Infectious Diseases) reported on the evaluation of the filariasis control program in Tahiti, based on surveys made before and after 5 years of standardized treatment and mosquito control.

The surveys were made on a variety of the manifestations of filariasis in the male population of Tahiti. Surveys for both microfilaremia and elephantiasis encompassed all the males of 15 districts, 3390 in 1949 and 4262 in 1959 for microfilaremia; also in 1959, 7360 persons were examined for elephantiasis.

In 1949, 38% of the study population demonstrated a positive microfilaremia and 7% were affected with elephantiasis. Ten years later the comparable percentages were 6.5 and 2.3. The control program responsible for this sharp decrease consisted of mass treatment with diethylcarbamazine, plus elimination of mosquito breeding areas within 100 meters of dwellings.

Diethylcarbamazine (Notezine) was administered in 12 monthly doses of 6 mg per kg of body weight, with additional treatment to the few with recurrent positive blood films. Drug therapy was well accepted. Persons experiencing lymphangitis attacks often requested medication because they were able to observe at first-hand the benefits of therapy.

No new cases of elephantiasis or hydrocele developed following application of control measures. Another important finding was a drop in cases of elephantiasis from 6.9% to 2.2% for all males. In the significant laboring-age group (20 to 40), there was a reduction from 5 to 0.6%. Total hydroceles were reduced from 9.8 to 3.2%. Among males older than 20, acute filarial lymphangitis attacks fell from 36 to 4%. In untreated cases, these attacks occur several times a year, often requiring 3 days of bedrest per episode.

Projecting the survey findings to a total rural Tahitian population of approximately 20,000, at least some 500 fewer persons were handicapped by elephantiasis in 1959 than in 1949. In persons over 20, attacks of lymphangitis were reduced from 3,430 in 1949 to 380 in 1959. Conversely, the percentage of that group free from signs of clinical filariasis increased to 49% in 1959 as contrasted to 16% in 1949. Since no new cases have appeared it is expected that when those now infected die, elephantiasis will cease to exist in those islands where an adequate control program is followed. (Highlights of Research Progress in Allergy and Infectious Diseases, 1960, DHEW PHS 829:27-28, 1960)

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### Chemotherapy of Malaria

The use of chemotherapy in malaria eradication programs is no longer confined to those circumstances in which spraying with residual insecticides is either impracticable or relatively imperfect. Antimalarial drugs play an essential part in the last phase of eradication when they are used, in conjunction with surveillance activities, for the diminution of the parasite reservoir and for quick action against imported infection. It is also recognized that the time required to achieve complete interruption of transmission and elimination of the parasite reservoir may be considerably reduced by the judicious use of these drugs.

In the areas where insecticides alone are fully effective in interrupting transmission, the use of drugs during the last year of the attack phase accelerates the success of the spraying campaign, and a single dose treatment is usually given to all suspected cases encountered during the surveillance activities introduced at that stage of the campaign. Chloroquine or amodiaquine are the drugs most often used, occasionally in association with pyrimethamine. The purpose of this treatment is not only to relieve clinical symptoms, but also to make the patient noninfective to mosquitoes for a certain number of days.

Where, for various reasons, complete interruption of transmission by insecticides alone is difficult, mass administration of drugs may be required as a supplementary measure to residual spraying. It may take the form either of a single dose given to each member of the population at the time when house spraying is carried out, or of regular administration of drugs to the whole population, repeated at short intervals over a period.



After the successful completion of the attack phase the use of anti-malarial drugs during the consolidation phase is of primary importance. During this phase presumptive (single dose) treatment of all suspected malaria cases and subsequent radical treatment of all confirmed cases to prevent relapses are the principal measures for eliminating residual infection and foci of transmission. The same applies to the maintenance phase, when drugs are also essential to prevent any new spread of disease from imported cases. The full treatment aiming at radical cure of all cases may encounter difficulties in many countries. While the radical cure of falciparum infections is relatively easy, the relapsing vivax and malariae infections require an additional treatment of 14 days with an 8-aminoquinoline (primaquine or quinocide) and some degree of medical supervision because of the potential toxicity of the drugs employed. Thus far, only countries with well-developed rural health services have been able to carry out efficient radical treatment of most, or all, malaria cases. In certain areas which are difficult of access and where the population is widely scattered, the 14-day treatment with 8-aminoquinolines has been tentatively replaced by single doses of pyrimethamine given once monthly for 6 months or every 3 weeks during the transmission season. The value of this method has not been fully assessed.

Finally, there are circumstances which preclude the use of insecticides, as for example when the population is widely scattered in very large areas without communications. In these conditions, chemotherapy may be the only method of attack and the most practicable way of administering it appears to be by adding antimalarials to the common household salt used by the population (Pinotti method). Chloroquine is now considered to be the most suitable drug for use in medicated salt. One of the main obstacles to the large-scale application of chloroquinized salt has been the difficulty of preparing a chloroquine salt mixture of adequate stability under conditions of high humidity in the tropics. There is now some evidence that a satisfactory solution to this problem may be found; this would make it possible to use medicated salt more efficiently and on a larger scale.

It may be said that modern antimalarial drugs are adequate for suppression treatment and radical cure of malaria in individuals or small well-supervised groups. The exigencies of malaria eradication programs, especially in developing countries, are such that the drugs available today often fall short of expectations, mainly because their adequate administration is difficult. All the present drugs have a relatively short carry over effect, and this is a serious drawback to the full use of antimalarials in many areas of the world. There is an urgent need for an antimalarial with a prolonged action on the pre-erythrocytic cycle of the development of the parasite in man, and for a long acting schizonticide. These would facilitate administration, which could be no more than once every 3 months or once every 6 months. New drugs are also required for the radical cure of relapsing vivax and malariae infections in order to shorten the time needed for the treatment. The best drug for this purpose would be an antimalarial with a full effect after a single dose or after a treatment not exceeding 3 days.



These problems were reviewed at a Technical Meeting on the Chemotherapy of Malaria convened by the World Health Organization from 14-19 November 1960, in Geneva, Switzerland. The participants included research workers in chemotherapy, malariologists, chemists, and industrial biologists. (WHO Chronicle 15:29-31, January 1961.)

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Fish Poisoning, Naval Air  
Station, Barbers Point, Hawaii

A group of about 30 military personnel and dependents attended a squadron fish fry in July. The group consumed parts of 3 different fish which had been caught off Midway Island 8 days previously.

The fish, Tuna (yellowfin), Dolphin (mahimahi) and *Elagatis bipinnulatus* (rainbow runner, kamanu, Hawaiian salmon) had been frozen prior to air shipment to Barbers Point; minimal surface defrosting occurred in flight. The fish were replaced in a home freezer until the morning of the fish fry at which time they were thawed. After thawing was complete, the fish were stored in ice until fried. The Tuna and Dolphin were caught in deep water, but the *Elagatis bipinnulatus* was caught in shallow water.

The fish were all cooked over a grill; the Tuna and Dolphin being prepared during the earlier part of the afternoon. Later the *Elagatis bipinnulatus* was prepared. Six individuals who ate this latter fish became ill. Persons who did not partake of the *Elagatis bipinnulatus* suffered no ill effects.

The onset of symptoms began within an hour in certain cases, and some individuals noted new symptoms as long as 10 days following ingestion of the fish. The early symptoms were those of a gastrointestinal nature, including abdominal cramping, diarrhea, nausea and vomiting. Most patients developed neurological symptoms, especially paresthesia of the extremities, tongue and circumoral region. All patients complained of malaise. Restlessness and bradycardia were common and 2 patients were noted to have a temporary hypotension.

The acute gastrointestinal symptoms were of relatively short duration, but several of the neurological abnormalities persisted after 10 days. Treatment was symptomatic. Cortisone preparations were of no value. Injections of Vitamin B-12 provided relief from the neurological symptoms for only 12 hours.

It was concluded that the etiology of the outbreak was Ciguatera poisoning as the result of ingestion of the fish *Elagatis bipinnulatus*.

Among the recommendations suggested to prevent a recurrence of similar outbreaks was one to consider all fish, especially brightly colored varieties (barracuda, jacks, *Elagatis bipinnulatus*), obtained from or near atolls, lagoons and reefs, toxic and unfit for human consumption. (Preventive Medicine Division, BuMed)

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**DENTAL****SECTION**The Transition from Natural to Artificial Teeth

M. M. DeVan DDS, University of Pennsylvania, Philadelphia, Pa. J Pros Dent II:677-688, July-August 1961.

The way in which the transition was made from natural to artificial teeth looms large as a factor in the failure of prostheses and in difficulties encountered with troublesome prosthetic patients. In questioning patients with unsatisfactory prosthetic restorations, it was revealed that (1) teeth were removed without the benefit of immediate or subsequent replacements and (2) complete dentures were planned for the patient without probational periods with partial denture replacements.

In many instances complete dentures must be prescribed to correct infection, malfunction, or a displeasing appearance. However, it is not what is prescribed but rather the manner in which the prescription is filled that may account for the difference between the uneventful, smooth transition from natural to artificial teeth and a transition filled with psychologic and physical trauma. Trauma will be proportional to the sensitivity of the patient. In serving a highly sensitive patient, reactions and results are not predicated mainly on what is done but on how it is done, when it is done, where it is done, and by whom it is done.

There are two categories of sensitivity for the prosthodontist to consider: (1) sensitivity due to immaturity and (2) sensitivity that results from hyperperception.

The immature adult is sensitive to situations that would not bother the normal adult. The immature person is easily annoyed, easily offended, and wears his feelings on his shirt sleeves. The slightest provocation causes him to feel neglected, wronged, and slighted.

Sensitivity from hyperperception is due to superawareness and to unusual perception of nuisances and shades and degrees of significance and meaning. These individuals appear to be perfectionists who are highly critical of what they do and what is done for them. They generally have a low threshold to pain and are aware of pressures unfelt by the average person.

No animal in its natural environment outlives the loss of its teeth. Modern man is able to survive edentulousness primarily because of the artificial methods of food preparation before ingestion.

Dentistry has the know-how to substitute adequately for the lost physical equipment essential to masticate prepared foods and restore pleasant

appearance. However, more knowledge and better procedures are needed to ease the transition and lessen the feeling of toothlessness on the part of the patient. An edentulous state often causes psychic as well as somatic repercussions which may be violent or mild, depending on the prescribed procedures and on the personality of the patient.

Edentulousness is bad enough. However, nondentulousness is nearly intolerable except by a recluse. Nondentulousness is the condition in which an individual has lost the natural teeth and has not mastered the technique of using artificial teeth.

Persons react deeply to dental problems because the teeth and their enveloping bone support the mouth to an attractive fullness. A pleasantly contoured mouth has a strong appeal, especially to the opposite sex. To mar the mouth of the sensitive person is to deliver a tremendous blow to self-esteem.

The impact of an event upon one's life depends upon the duration of the event and when it occurs. To lose the teeth late in life, when many contemporaries are losing theirs, causes reactions different from those resulting when teeth are lost early. The element of duration usually acts to cushion the impact of an event upon the personality.

The feeling of toothlessness felt by the patient must be minimized. A feeling of toothlessness is likely to be mentally associated with the loss of vigor, youth, and stamina.

The dentist should classify him, as philosophic, exacting, hysteric, or indifferent. Insight into the mind of the patient is gleaned by what he says in conversation and the expression of his face, hands, and body. Note if the individual has temperance in his speech and countenance, and discern if his expressions are mild, moderate, or extreme. Is he calm and considerate, or is he agitated, unfriendly and prejudiced?

It is always safer to inject the element of time in rendering a patient toothless, but it is imperative to do so when dealing with intemperate, hostile, agitated, and generally prejudiced individuals.

The masticating apparatus develops in time as well as in space. We are born with 10 fingers, 10 toes, 2 eyes, etc., which grow in size but do not increase in number. However, we are born toothless and a score of years is required to bring the teeth and their associated structures to a state of full development. The mechanism is not fully developed until the third molars erupt and align themselves. Nature has seen fit to inject the fourth dimension, the element of time, into the development of the masticating apparatus.

Therefore, when planning the demolition of the dental arch, it may be wise to employ the element of time. The physical condition of the teeth may warrant their immediate removal, yet for many individuals, the necessity of caution will counsel delay.

Complete edentulousness may be postponed through the use of an additive removable partial denture. Thus, the personality is given an opportunity to adopt the dentures while the mouth tissues are given time to adapt themselves to their presence. The procedure of permitting a patient to be partially or completely toothless for any length of time is generally outmoded, for



physical, physiologic, and psychologic reasons. Physical factors for replacing missing teeth include (1) disuse atrophy of the bony base, (2) unfavorable trabeculation of the repairing bone, and (3) possible damage to the ligaments surrounding the temporomandibular joints. The physiologic reasons for replacing missing teeth are (1) abnormal functioning of the mouth and mandible, (2) impaired enunciation, and (3) abnormal deglutition. The psychologic reasons for replacing missing teeth are (1) humiliation suffered by the patient because of impaired performance of routine social functions, (2) adverse subjective reactions, and (3) indifference.

Generally, the following make for poor results with a complete denture and indicate its delay when possible: (1) jaw deformities and abnormalities, (2) speech defects, the result partially of abnormal tongue, lip, and cheek action, (3) lack of stamina and health, (4) intemperate or hysteric attitude, (5) indifference to appearance, (6) lack of complete rapport, and (7) the feeling that complete dentures are not more advantageous than the present condition.

People differ considerably in their acceptance of complete dentures. Persons who have lost the teeth slowly and naturally (in the sense that the natural teeth loosened) have little difficulty in rehabilitation when complete dentures are made. The person who puts up with loose teeth will endure a loose denture, and all dentures are loose when compared with sound natural teeth. A thicker, less rigid membrane (the mucoperiosteum) attaches a denture to the supporting bone, whereas a thin, rigid membrane (the periodontal membrane) joins the natural tooth to the underlying bone.

Edentulousness is characteristic of older people to be sure, but is it characteristic of old age? Toothlessness is a feature of old age only when the natural teeth fall out of their sockets and are not forcefully removed. Many cases of toothlessness are not natural but intentionally brought about with a pair of forceps.

An additive removable partial denture is so planned that other units may be added without depriving the patient of the use of the denture for more than a few hours. These additions may constitute an immediate replacement of the condemned natural tooth or teeth. The denture is designed so that its initial metallic parts facilitate additions without seriously jeopardizing the stability and retention of the restoration.

The additive design eases the transition from natural to artificial teeth and also helps promote acceptance of removable partial dentures.

Why partial dentures? Why not face the inevitable now, namely, complete dentures?

The additive design promotes durability because one of its cardinal principles is the use of all available tooth-bearing and tissue-bearing areas in the mouth. As a consequence, the denture is so stable that periodontal and mucoperiosteal torque is kept well within physiologic bounds. Abutments usually fare well and generally remain firm and serviceable because of the above principle and other factors.



The principles of the additive design may be grouped into 5 categories: (1) the utilization of all available tooth-bearing and tissue-bearing surfaces in the mouth as long as it does not permanently interfere with speech and appearance, (2) maximum use of contact bearings on proximal and occlusal surfaces of the remaining teeth (contact bearings on buccal, lingual, and labial surfaces are employed sparingly), (3) the use of the infrabulge proximal retainers wherever factors of aesthetics will allow, (4) the use of rigid broad, ribbonlike connectors instead of bars, and (5) modification of the occlusal pattern with the neutrocentric concept.

The convertible denture, or that for pre-edentulousness, is used when 3 teeth or less remain in the mouth. The flanges and palatal form closely resemble those of a complete denture. The tooth factors of position, proportion, pitch, form, and number simulate those employed for complete dentures. Thus, the removable denture can be converted easily to a complete denture when retaining the few remaining teeth becomes undesirable.

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#### The Place of Corticosteroids and Antihistamines in Oral Surgery

Conrad J. Spilka, DDS, School of Dentistry, Western Reserve University, Cleveland, Ohio. Oral Surg, Oral Med, Oral Path 14:1034-1042, September, 1961.

In the past 12 years, since Hench and associates discovered the potent anti-inflammatory properties of cortisone, this compound and a series of newer adrenocortical steroids have found wide application in virtually every branch of medicine.

Nevertheless, in spite of more than a decade of widespread clinical acceptance, the corticosteroids are used relatively little in oral surgery, where edema and resulting pain, together with trismus, cause serious discomfort in over 75% of the patients. The hesitancy in using corticosteroids appears to be due primarily to 3 suppositions: (1) possible interference with wound healing, (2) danger of masking postsurgical infections, and (3) possible occurrence of serious side effects. In the light of current knowledge, however, these suppositions can no longer be considered valid objections to the judicious use of adrenocortical hormones in oral surgery, that is, to their use in the relatively low dosages and for the short periods of time required in the successful management of postoperative edema.

Although some investigators have held the belief that corticoids may retard wound healing, a number of studies on this subject have failed to yield evidence to support this contention.

Rukes and associates used intravenous hydrocortisone in more than 50 surgical cases and found "no case in which there was wound dehiscence due to this medication." More recently, Krasner employed a combination of



prednisone and chlorphenpyridamine in the treatment of 485 oral surgery patients and found that this combination did not interfere with wound healing but, on the contrary, accelerated the healing process.

As for the possible danger of masking infections with the administration of corticosteroids, this can be avoided by careful observation of the patient and by administration of appropriate antibiotics when indicated—either prophylactically or when infection is present.

In view of the relatively low dosages employed and the short periods of administration required, steroid side effects are generally not seen in oral surgery. However, a complete history should be taken routinely, so that the use of corticoids may be avoided in patients with absolute or relative contraindications. Patients should also be queried as to whether they have recently been on prolonged steroid therapy or whether they are currently taking steroids.

The antihistamines constitute another group of compounds which have been used for a number of years in the control of allergic reactions, including those of an inflammatory nature.

Highly encouraging results also have been reported with the use of a corticosteroid-antihistamine combination in oral surgery by Stewart and by Krasner. Krasner's description of the rationale for the use of such combinations includes:

"The rationale of therapy with the prednisone-chlorphenpyridamine combination lies in the prednisone; its corticosteroid component exerts a suppressive effect on the basic anti-inflammatory process by (1) inhibiting migration of inflammatory cells (leucocytes and macrophages), (2) decreasing vascular permeability, and (3) reducing exudation. Chlorphenpyridamine, its antihistamine component, (1) blocks the effect of histamine released as a result of tissue trauma, and (2) helps control swelling and pain following surgical trauma by reducing tissue distention."

A two-part study was conducted to determine the relative efficacy of corticosteroids and corticosteroid-antihistamine combinations in the reduction of postoperative edema. The first part consisted of a double-blind study comparing a steroid, a steroid-antihistamine combination and a placebo, while in the second part only the effects of the steroid-antihistamine combination were observed.

Three preparations were used in the double-blind study: one contained 5 mg of prednisone per tablet; the second consisted of 2.5 mg of prednisone, 2 mg of chlorphenpyridamine, and 75 mg of ascorbic acid; and the third, containing no active ingredient, served as the placebo for control purposes. The 3 preparations were identified only as compounds A, B, and C, and neither the patients nor the author knew at any time during the study which medication was given. To ensure absolute freedom from bias, a nurse was instructed to give one of these preparations, in turn, to each postsurgical patient prior to his or her leaving the office.

The 3 medications were given to 105 consecutive oral surgery patients from the author's private practice. The 3 compounds were alternated, with the first patient receiving compound A, the second compound B, the third

compound C, the fourth compound A, and so on. The 105 patients studied included 41 males and 64 females ranging in age from 10 to 67 years. Thirty-five patients received compound A, 33 received compound B, and 37 received compound C. The slightly lower number of cases receiving compounds A and B is explained by the fact that 6 patients in these 2 groups failed to return for their postoperative visits and thus had to be eliminated from the study. The 3 groups were made up of patients undergoing substantially similar procedures. The majority had multiple extractions with or without alveolectomy or maxillary resection; a number of other procedures were also included in the study.

In the second part of the study, the prednisone-chlorprophenpyridamine combination was given to 56 consecutive oral surgery patients (33 males and 23 females, ranging in age from 14 to 63 years). This group included 37 cases of multiple extractions with or without alveolectomy or maxillary resection, 18 single extractions, and one apicoectomy.

All patients in both studies were given one tablet 4 times a day for 5 days and were seen for evaluation on the first or second postoperative day and again on the sixth or seventh postoperative day. Except for codeine or aspirin, which were given where indicated for pain relief, the patients received no other medication.

Of the total of 35 patients who received compound A (prednisone, 5 mg) 4 times daily for 5 days, 20 (57%) had less than the expected degree of postoperative edema, 14 (40%) had the expected degree, and 1 (3%) had more than the expected degree. In no case was there any detectable interference with wound healing.

In the group of 33 patients who received compound B (the combination of 2.5 mg prednisone and 2 mg chlorprophenpyridamine) 4 times daily for a total of 5 days, the reduction of postoperative edema was dramatic. Twenty-seven patients (81.8%) had less than the degree of edema normally expected following the procedures that were carried out, 4 (12.1%) had the expected degree of edema, and 2 (6.1%) had more than the expected degree. It is noteworthy that the majority of these patients reported no pain or minimal pain on the second postoperative day. This may have been due to the exceptionally low degree of edema seen in this group.

The results in the series receiving compound C, (the placebo) were rather poor, in that 18 patients (48.6%) had the expected degree of edema, 7 (19%) had more than the expected degree, and 12 (34.4%) had less than the expected degree.

Following evaluation of the results of the double-blind study, it was decided that the investigation should be extended. In view of the favorable results observed with the prednisone-chlorprophenpyridamine combination, however, it was felt that this medication should not be withheld from patients; thus, the study was continued with this combination as the sole agent. The results obtained confirmed those of the double-blind study; that is, of 56 patients, 43 (76.8%) had less than the expected degree of edema, 12 (21.4%) had the expected degree, and 1 (1.8%) had more than the expected degree.

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Personnel and Professional Notes

Mercury Vapor Investigated in the Dental Department. Mercury vapor was investigated in the Dental Department, U. S. Naval Air Station, San Diego, Calif., where significant amounts of the metal had been allowed to spill from the amalgam preparation benches and from residual amalgam containers. Concentrations varied from 0 to 0.2 milligrams per cubic meter, with an average of 0.5 milligrams per cubic meter at the breath zone of the amalgam preparation area. It has been recommended that stainless steel trays be used for amalgam mixing to prevent spillage and that residual materials be stored in well-stoppered glass jars.

CDR Pablos is Certified. CDR Tomas C. Pablos, DC, USN, has been notified by the Secretary of the American Board of Prosthodontics that he has met the requirements of the Board and is now a Diplomate.

CDR Pablos is on duty in the USS BUSHNELL (AS-15).

Naval Reserve Dental Company Wins Plaque. The Commandant, Sixth Naval District, announced that Naval Reserve Dental Company 6-12, Memphis, Tenn., was the First Place Winner in the Staff Corps Specialist Programs competition.

CDR H. V. Reed DC USNR, is the Commanding Officer and CDR R. L. Parrish DC USNR, is the Executive Officer of the Dental Company.

Dr. Hirschfeld Lectures at Parris Island. Dr. Leonard Hirschfeld, Associate Clinical Professor of Dentistry, Section of Periodontology, School of Dental and Oral Surgery, Columbia University, New York, presented a lecture on 19 September 1961, entitled Practical Points in Periodontia, before the Parris Island Dental Study Club.

CAPT William F. Fowler DC USN, is the Officer in Charge of the Dental Detachment, Marine Corps Recruit Depot, Parris Island, S. C.

CAPT Coughlin Retires. CAPT Donald M. Coughlin DC USN, was placed on the retired list of the Navy in September 1961. He was born in Kaukauna, Wisconsin, in December 1901, graduated from the Dental School, Northwestern University in 1925, and for 15 years conducted a private practice in Chicago, Illinois. In 1935 he accepted a commission of Lieutenant in the Dental Corps, U. S. Naval Reserve (Inactive). In May 1941 he reported to the U. S. Naval Training Center, Great Lakes, Ill., for his first tour of active naval service. During World War II CAPT Coughlin served as the Commanding Officer of the U. S. Naval Dental Clinic, Guam, and later as the Force Dental Officer, Naval Air Forces, U. S. Atlantic Fleet. Prior to his retirement he was the Senior Dental Officer at the Marine Corps Supply Center, Barstow, Calif.

Dental Division Panel Discussion. The Assistant Chief of the Dental Division, Bureau of Medicine and Surgery, and the heads of the various branches of the

Division presented a panel discussion at the U. S. Naval Dental School, NNMC, Bethesda, Md., on 29 September 1961.

CAPT M. G. Turner, Executive Officer of the School, introduced the Assistant Chief, CAPT Robert S. Snyder, Jr., DC USN, panel moderator, to the audience of staff, resident, and postgraduate dental officers, and guests. The panel explained the organization of the Dental Division and each panel member discussed the function of the branch which he heads, as follows: Personnel Branch, CAPT Edward C. Raffetto DC USN; Professional Branch and Research Branch, CAPT William R. Stanmeyer DC USN; Planning and Logistics Branch, CAPT George O. Stead DC USN; and Dental Reserve Branch, CAPT Harry J. Wunderlich DC USN.

CAPT Johnson Appears at Cape Cod Meeting. CAPT Harvey S. Johnson DC USN, Diplomate, American Board of Oral Surgery, Chief of Dental Service, U. S. Naval Hospital, Chelsea, Mass., appeared before the Cape Cod District Dental Society Meeting held 28 September 1961 at Otis Air Force Base Officers' Club, Cape Cod, Mass.

CAPT Johnson was the principal speaker at the meeting. His presentation was entitled Differential Diagnosis and Oral Manifestations of Systemic Disease.

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**RESERVE**



**SECTION**

Officers With 20 Years of Satisfactory  
Service to be Removed From Pay Status

Virtually all Naval Reserve officers on inactive duty who have completed 20 years of satisfactory Federal service will be removed from a pay status effective 30 October.

The Chief of Naval Personnel will advise commandants which officers are to be dropped from drill pay status. Officers who have billets as commanding officers may be retained in a pay status for completion of their normal command tour of one year. In the future, commanding officers will be removed from a pay status by the end of the first quarter following the Bureau of Naval Personnel notification to commandants of the commanding officers' completion of 20 years of satisfactory Federal service.

In addition, the assignment of inactive Reserve captains and commanders to pay status—except for the replacement of DE division commanders, brigade commanders, division commanders and commanding officers—has been suspended indefinitely.



The changes in policy stem from a National Naval Reserve Policy Board recommendation. Requests for waivers under the new policy are not desired; however, in cases where the Reserve program will be adversely affected, commandants may consider the granting of waivers.

Details will be incorporated into a BUPERS Instruction, 1570 series, not promulgated as this issue went to press.

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### Look for Your Answers in Current Directives

Have you been wondering about promotion possibilities, retirement regulations, correspondence courses? In any event, you don't have to rely on your memory, scuttlebutt, or sea lawyer's advice. Whatever your question, you're likely to have the answer virtually at your fingertips—in official references and directives.

Copies of directives and references are not available for distribution to individual Reservists. However, most naval activities maintain complete files of this information.

Here are some of the basic references which should answer most of your Reserve career questions.

U. S. Navy Regulations — Sets forth the principles and policies by which the Navy is governed.

Navy Department General Orders (Series of 1948) — Supplements Navy Regulations and includes orders relating to special ceremonies, commendations, organization, budget and appropriations, and similar matters.

BUPERS Manual — Contains instructions governing the many phases of Navy personnel administration. Part H deals with the Naval Reserve.

Bureau Manuals — Contain instructions pertaining to the various bureaus within the Department of the Navy.

BUPERS Instructions and Notices — Directives issued by the Chief of Naval Personnel containing policy and procedure concerning the administration of naval personnel. Instructions are defined as directives "which contain information of a continuing nature." Notices are directives of "one time nature, and contain information or require action which is applicable for a brief period of time."

Joint Travel Regulations, 1951 — Explains laws and regulations concerning travel and station allowances; sets forth the manner in which transportation is furnished; covers reimbursement for travel expenses; and so on.

U. S. Navy Travel Instructions — Contains instructions relating to the travel of naval personnel in their performance of duty, or in connection with changes in duty stations.

U. S. Navy Uniform Regulations — Describes uniforms and contains regulations for the proper wearing of the naval uniform.

Navy and Marine Corps Awards Manual — Provides information pertaining to awards, medals, personal decorations, etc. The manual also contains



eligibility lists of all ships, units, service groups, divisions and squadrons for certain awards.

In addition to these more general reference works, there are dozens of directives and publications which deal with specific Reserve matters. Following are some of the most important directives. As you know, The Naval Reservist publishes information on important directives and prepares frequent roundups of information on various subjects. Some of these articles are also referenced for the guidance of those Naval Reservists who do not have ready access to references and directives.

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You'll Find Answers to Naval Reserve  
Career Questions in References and Directives

<u>Subject</u>	<u>Pertinent Reference</u>
<u>The Naval Reserve</u>	
Organization of the Naval Reserve Under the Armed Forces Reserve Act of 1952, as amended. (Now Title 10, United States Code.)	BuPers Instr. 1001.5B.
Tables of Organization for the Naval Reserve	BuPers Instr. 5400.1J.
<u>Advancement; Change in Rate, Rating</u>	
Advancement and changes in rates and ratings of enlisted Reservists on inactive duty	BuPers Instr. 1430.1D.
<u>Appointment to Commissioned Grade</u>	
Regulations Governing the Admission of Candidates in the U. S. Naval Academy as Midshipmen	NavPers 15010.
Regular NROTC Program	BuPers Instr. 1111.3
Officer Candidate School (OCS)	BuPers Instr. 1120.29A.
Naval Aviation Cadet (NavCad)	BuPers Instr. 1120.20B.
Naval Reserve Integration Program	BuPers Instr. 1120.26B.
Medical Service Corps, USNR	BuPers Instr. 1120.23B.
Staff Corps Appointments	BuPers Instr. 1120.6A.
Special Duty Officers (Law) (1620)	BuPers Instr. 1120.21A.
Commission Opportunities for Reservists	The Naval Reservist, August 1961.
<u>Designator Codes</u>	
Billet and Officer Designator Codes	BuPers Instr. 1210.4C.
Change of Officer Designator Codes	BuPers Instr. 1210.6A.



<u>Subject</u>	<u>Pertinent Reference</u>
<u>Officer Promotion</u>	
Promotion of USNR officers	BuPers Instr. 1412.1D.
Professional fitness for promotion of USNR officers (the "promotion plan")	BuPers Instr. 1416.4C.
Roundup of Correspondence/NROS Courses required for promotion of officers	The Naval Reservist, August 1960.

(to be continued)

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Association of Military Surgeons

The 68th Annual Meeting of the Association of Military Surgeons of the United States will be held on 6, 7, and 8 November 1961 at the Mayflower Hotel, Washington, D. C. The theme, International Medicine—Path to World Progress, will be set in an address by Doctor Thomas Parran, former Surgeon General of the U. S. Public Health Service and Past President, Association of Military Surgeons. The Chief of Naval Personnel has authorized the crediting of one retirement point to Naval Reserve Medical Department officers for attendance at each session of at least two hours duration. A maximum of 3 retirement points are authorized per eligible officer. A representative of the Chief, Bureau of Medicine and Surgery will be available to record attendance.

POSTAGE AND FEES PAID  
NAVY DEPARTMENT

DEPARTMENT OF THE NAVY  
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